
Project Management Office

Recommendation

Travel & Expense Management System (TEMS)

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Revision 1.0

Revision History

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Recommendation

1. Build TEMS with OFM resources. Develop a travel & expense management system that will serve the state's enterprise needs. This alternative will effectively meet the immediate drivers to expand the business scope, address the issues around deployment, and provide accessibility. This alternative will create the least business process disruption, retraining, and changes in terminology. The one-time and on-going costs are made up of existing staff and minor upgrades to existing hardware and infrastructure. There may be some small software acquisitions (rules-based engine, workflow software).
2. SAP's Travel module meets most of the TEMS functional requirements and offers significant enterprise benefits. If the SAP Travel module was implemented under the Human Resources Management System (HRMS) SAP instance, the personnel database could be used for traveler profiles and workflow. Employees could use the Employee Self-Service (ESS) portal to request their travel reimbursements. However, HRMS has several other major priorities that need to be addressed before this solution is feasible and several enablers need to be in place (e.g., Dept. of Personnel (DOP)/Office of Financial Management (OFM) governance agreement, HRMS SAP upgrade, ESS in place).

The new TEMS should be used until the HRMS priorities are met and DOP and OFM are ready to work together to implement the SAP Travel module (Biennium 09-11 or later). Then TEMS should be phased out in favor of the SAP Travel module.

The second part of this recommendation needs to be reassessed over time as the situation changes or becomes clearer.

Alternatives

Discovery Process

Building the application ourselves is a viable option. There is little technical or business risk to a build. The TEMS Team is experienced in building successful similar applications.

We requested information from Gartner on travel & expense management. Gartner categorized the vendors that would address our requirements into niche or commercial off-the-shelf (COTS), application service providers (ASP), and enterprise resource planning (ERP).

The TEMS Team explored the vendor web sites and got more information and white papers from general sources, such as the Aberdeen Group.

The Roadmap provided a possible decision options matrix for projects that have an enterprise scope, such as TEMS. The TEMS Team analyzed each option as it applied to TEMS:

- Authorize Project to Proceed (may not be an enterprise solution). This is not an option for TEMS. TEMS would need to be implemented as an enterprise solution because it serves the needs of over twenty agencies.
- Authorize Project to Proceed with Changes (could be an enterprise solution). This is an option because the TEMS product will be used as an OFM enterprise solution.
- Authorize a Temporary Solution (retired when an enterprise solution is available > four years out). There is no advantage to a temporary solution. The product we deliver now will be required to and should be able to run as an OFM enterprise solution.
- Wait until the Roadmap Solution is Available. This is not a viable option because there are immediate business drivers that cannot wait for a Roadmap solution that is > four years out.

To get more information about how the commercial travel & expense management products work, the TEMS Team decided to contact representative vendors from each category and ask to find out more about their products.

The TEMS Team contacted two representative vendors from the COTS category that were mentioned prominently in our research. One vendor also offered an ASP product. Each vendor was well established and had substantial market share. These vendors delivered a demonstration and question/answer session with the Team.

Because HRMS is using SAP, the TEMS Team contacted the local SAP sales contact to represent the ERP category. During the SAP demonstration, we were presented with three SAP options:

- Run the Travel module as a standalone SAP instance at OFM.
- Run the Travel module as part of the HRMS SAP instance.
- Wait for the state Roadmap solution, which may be to implement SAP financials. Then implement Travel as part of the financial modules. This is not a viable option because there are immediate business drivers that cannot wait for a Roadmap solution that is > four years out.

Description of the Alternatives

Based on the discovery process, these are the alternatives the TEMS Team considered.

1. Build. The TEMS Team would build the travel & expense management product with internal OFM staff.
2. Commercial Off-The-Shelf (COTS). OFM would purchase a vendor product, load it on OFM hardware, and run it over the state's network.
3. Application Service Provider (ASP). The product would run on the vendor's hardware and infrastructure. OFM would pay a usage fee paid to the vendor.
4. SAP off the HRMS SAP instance. OFM would partner with DOP to enable the SAP Travel module to run off the HRMS SAP instance. The module would use current (and perhaps additional) DOP servers and run over the state's network.
5. SAP Standalone. OFM would purchase a separate SAP license and run the Travel module and all necessary supporting modules on OFM servers over the state's network.

Fit/Gap Analysis

The Team sent each vendor a copy of the TEMS Software Requirement Specifications before seeing a product demonstration and holding a question/answer session. The Team members individually rated the product against the business and functional requirements. The Team members met and compared ratings. For the items where there was unresolved disagreement or uncertainty, the Team sent the vendor a list of questions, which the vendor answered and sent back to OFM. The Team reviewed and incorporated the vendor responses with the Team's ratings.

See Appendix A for a table showing the ratings for how the alternatives met the TEMS functional requirements. Appendix B shows the ratings for the technical requirements.

Functional Requirements

Build: This is the best fit to the functional requirements. The TEMS Team would build the product to meet all the essential functional requirements. The Team would build the product to minimize retraining. There would be little if any policy changes necessary.

COTS: This is a good fit. The COTS products are highly configurable. They would be able to meet most of the essential requirements, although there would be some business process change, retraining, and perhaps some policy changes necessary during implementation.

ASP: This is a good fit. The ASP products are configurable, although probably less so than if you are running your own COTS version. They would be able to meet most of the essential requirements, although there would be some business process change, retraining, and perhaps some policy changes necessary during implementation.

SAP Using HRMS SAP Instance: This is a good fit. The SAP product is probably less configurable than the COTS products. SAP would be able to meet most of the essential requirements, although there would be business process change, retraining, and perhaps some policy changes necessary during implementation.

SAP Standalone: This is a good fit. The SAP product is probably less configurable than the COTS products. SAP would be able to meet most of the essential requirements, although there would be business process change, retraining, and perhaps some policy changes necessary during implementation.

Technical Requirements

Build: This is the best fit to the technical requirements. The TEMS Team would build the product to meet all the essential technical requirements.

COTS: This is a good fit. However, there will be issues around the architecture and tool sets. Some vendors may not use SQL Server databases or run operating software that is not within OFM's enterprise architecture.

ASP: This is a good fit. The ASP product would not be running on OFM's architecture or using the state's infrastructure. There may be issues around accessibility or deployment.

SAP Using HRMS SAP Instance: This is a good fit. HRMS' SAP is already running in the state's architecture. There may be issues around openness. HRMS is running SAP version 4.7, which is not easily accessible for persons with disabilities.

SAP Standalone: This is a good fit. An SAP standalone would require OFM to build the complete infrastructure necessary to support an SAP application.

Cost Analysis

Here is a summary ranking table comparing one-time, operational, and total costs for each of the alternatives.

Alternative	One-Time Costs	Operational Costs (5 years)	Total One-Time + Operational
Build	Medium Low	Medium High	Medium Low
COTS	Medium	Lowest	Lowest
ASP	Lowest	High	Medium
SAP using HRMS instance	Medium High	Medium Low	Medium High
SAP Standalone	Highest	Medium	Highest

The ASP option prices itself out of contention. The per transaction costs are going to be close to the current TVS transaction costs and would allow no margin for OFM support.

The following table is a cost model based on TEMS Team estimates to build the product and vendors' estimates based on size and complexity information OFM provided them. The estimates should obviously not be considered "best and final". The confidence level the TEMS Team has in the Build estimate is higher than the estimates on any of the other alternatives.

The low estimate for each row is based on the original estimate provided by the Team or the vendors. The high estimate is an effort to provide some contingency and it is 125% of the original estimate.

TEMS ALTERNATIVES COST MODEL		
Option Component	Low (100% of estimate)	High (125% of Estimate)
Build		
Implementation Duration (months)	18	23
Implementation	\$533,600	\$667,000
5 Yr Operations	\$1,099,700	\$1,374,700
Total Implementation + Operations	\$1,633,300	\$2,041,700
COTS		
Implementation Duration (months)	8	11

Implementation	\$736,000	\$1,261,000
5 Yr Operations	\$720,300	\$906,600
Total Implementation + Operations	\$1,456,300	\$2,167,600
ASP		
Implementation Duration (months)	8	10
Implementation	\$236,500	\$295,600
5 Yr Operations	\$1,708,000	\$2,135,000
Total Implementation + Operations	\$1,944,500	\$2,430,600
SAP w/HRMS		
Implementation Duration (months)	6	8
Implementation	\$1,099,800	\$1,374,700
5 Yr Operations	\$895,700	\$1,119,600
Total Implementation + Operations	\$1,995,500	\$2,494,300
SAP Standalone		
Implementation Duration (months)	11	14
Implementation	\$1,383,300	\$1,729,100
5 Yr Operations	\$922,500	\$1,153,100
Total Implementation + Operations	\$2,305,800	\$2,882,200

Appendix C lists assumptions that went into the cost analysis and model.

Anticipated Benefits & Risks

The following table documents the benefits and risks the Team identified for each of the alternatives.

Option	Benefits	Risks
Build	<ol style="list-style-type: none"> 1. Can get started right away. 2. Uses existing OFM staff, who are very familiar with the travel processes. 3. Does not require a large amount of startup money, which we don't have. 4. Best fit to the requirements. 5. Less disruptive to the customers. We can minimize the business process changes now. If we went with COTS we would have more business process changes and retraining. Then we may need to go through the change and retrain effort again if we go with an enterprise solution (e.g., SAP) in a couple years. 6. Lower retraining effort than COTS. 7. This can be an enterprise solution. We can continue to use it even if we do not go with an ERP, or use it as a loosely coupled solution. 8. Can keep current functionality that customers requested (point-to-point mileage). 9. Meet accessibility requirements. 	<ol style="list-style-type: none"> 1. Longer time to implement than a COTS solution. 2. Will not have all the configurability of a COTS solution. 3. Production issues may divert staff from the project.
COTS	<ol style="list-style-type: none"> 1. This solution could be used whether we go with an ERP or not. Therefore, it has a potentially long useful life. 2. Highly configurable. 3. Could closely adapt to Roadmap recommendations through reconfiguration. 	<ol style="list-style-type: none"> 1. Requires a fair amount of up-front money that we do not have. 2. Dependent on the vendor to provide an upgrade path. 3. Would require more business process change and retraining than Build.
ASP	<ol style="list-style-type: none"> 1. Not loaded on OFM infrastructure. 2. Does not require a large amount of upfront money. 	<ol style="list-style-type: none"> 1. Dependent on vendor viability. 2. On-going expenses are high – close to \$4.50 a voucher. If we kept the current rates there would not be much

Option	Benefits	Risks
		<p>left for supporting OFM helpdesk, training, and interfaces.</p> <p>3. Would require more business process change and retraining than Build.</p>
<p>SAP using the HRMS SAP instance</p>	<ol style="list-style-type: none"> 1. Capitalizes on the state's investment in SAP. 2. Possibly leverages the terms of the HRMS SAP contract. 3. The HR database would be the foundation for TEMS, with employee status, approval workflow, and profile business-rules information readily available. 4. The Employee Self-Service portal would add the TEMS components to the HR, giving it more functionality. 5. TEMS could use the HRMS interface to AFRS. 6. Supports the Roadmap enterprise modeling and initiatives. 7. The Enterprise Architecture and Integration Architecture issues and resolutions that are in place for HRMS could be leveraged by TEMS 8. The logical sequence principle would apply to doing Personnel and adding TEMS to it. 9. It would strengthen the enterprise profile for HRMS - it becomes HRMS & TEMS. 10. OFM and DOP would partner even closer than we have for HRMS. We would need to start the governance planning now. 11. May be able to use the HRMS hardware and infrastructure. 12. We would have an accessible product (provided we can upgrade from SAP 4.7). The SAP version we saw demonstrated has a user interface that is accessible. SAP has a VP in charge of accessibility. 	<ol style="list-style-type: none"> 1. This may not fit into DOP's vision for rolling out SAP releases. 2. DOP's rollout desires may not match TEMS timeline. If we started TEMS via HRMS later than FY08 (July 2007), we probably should do a build and delay the merger until later. 3. The DOP SAP contract may not allow us to easily add TEMS modules. 4. HRMS may have customized or configured the SAP instance so that it will not work effectively for TEMS. 5. The HRMS chart of accounts may not support TEMS' needs. 6. The HRMS SAP to AFRS translation process may not work to create Travel transactions. May need a different, or perhaps conflicting, set of tables than HRMS currently uses. 7. The SAP Travel model may require configuration in the SAP Financial Interface (FI) module that is not feasible or may adversely impact HRMS. The HRMS FI module may not be configured sufficiently to support the Travel module. 8. Resistance to change in areas such as, business processes, product ownership, and going to the SAP direction. 9. The HRMS SAP instance (v. 4.7) is not accessible. HRMS needs to upgrade for accessibility. 10. The financials in the HRMS instance may not be set up sufficiently for TEMS. There may be issues with the "black box" working for TEMS as well as payroll. 11. Issues around establishing a governance structure among OFM,

Option	Benefits	Risks
	<p>He told us of the commitment SAP has toward meeting Section 508 requirements and their path to get there.</p> <p>13. Could support employee reimbursement through payroll.</p> <p>14. It would be a good marketing position for OFM - if the state's policies are enforced in a TEMS system that is available to everyone through the portal they already have, it makes good sense to use that system.</p>	<p>DOP, and other agencies.</p> <p>12. May be dependent on a decision package for funding. If that does not go through, then we may not be able to go forward.</p> <p>13. SAP is not an open architecture. It does not fit well with the emerging integration architecture model.</p> <p>14. If we do go with SAP financials, we may have difficult issues in integrating the TEMS product running with HRMS.</p> <p>15. If we do not go with SAP financials, we may have issues in integrating the TEMS product running with HRMS with the product chosen for statewide financials?</p> <p>16. Costs may be higher than we want to accept at this point.</p> <p>17. There are issues around how to deal with non-state employees (e.g., volunteers, commission members) who get TEMS reimbursement.</p> <p>18. Unforeseen ERP issues that may arise.</p> <p>19. Need a study to see if this option feasible. This study may be expensive and time consuming. May not be able to get this done by July 2007.</p> <p>20. State may not select SAP for the financials solution.</p> <p>21. HRMS SAP product needs to be stable before we would begin this.</p> <p>22. There are issues around the organizational readiness for change.</p>

Option	Benefits	Risks
SAP standalone	<ol style="list-style-type: none">1. Should be able to use the HRMS personnel database to obtain user information.2. Could begin as soon as funding is obtained.3. Meet accessibility requirement4. Could purchase the current versions	<ol style="list-style-type: none">1. Additional costs to obtain a separate license and the hardware to run the application.2. Obtaining funding could be hard.3. Will require a daily interface of employee master data rather than the current pay period interface.4. Would require more business process change and retraining than Build.5. Requires OFM to recruit or train SAP configuration managers and other knowledgeable in operation SAP software.

Recommendation Analysis

Here is a summary of the main points for each alternative that the Team considered when making the recommendation.

Alternative	Recommendation Analysis
Build	Preferred alternative. No large one-time costs. Best fit for requirements. Least business process change and retraining.
COTS	Substantial one-time costs that would cut into fund balance. Require business process change, retraining, and probably some policy changes.
ASP	Substantial operational costs. At risk if the vendor goes out of business. Least control over configuration.
SAP off the HRMS SAP instance	Preferred enterprise alternative. However, other HRMS priorities come before this.
SAP Standalone	Would require OFM to operate a standalone SAP instance while DOP does the same. Most expensive alternative.

Here are the Team's findings for each alternative considering a broad set of evaluation criteria.

Criteria	Build	COTS	ASP	SAP w/HRMS	SAP Standalone
Functional Requirements	<ul style="list-style-type: none"> Meets them. Build to the requirements 	<ul style="list-style-type: none"> Meets them enough to do the job at an enterprise level. Need to configure. Need point-to-point mileage 3rd party. 	<ul style="list-style-type: none"> Meets them enough to do the job at an enterprise level. Need to configure. Need point-to-point mileage 3rd party. 	<ul style="list-style-type: none"> Meets them enough to do the job at an enterprise level. Need to configure. Need point-to-point mileage 3rd party. 	<ul style="list-style-type: none"> Meets them enough to do the job at an enterprise level. Need to configure. Need point-to-point mileage 3rd party.

Criteria	Build	COTS	ASP	SAP w/HRMS	SAP Standalone
Non-Functional Requirements	<ul style="list-style-type: none"> Meets them. Build to the requirements. 	<ul style="list-style-type: none"> Probably meets accessibility. Need to build interfaces from HRMS and to AFRS. 	<ul style="list-style-type: none"> May be accessibility issues. Need to build interfaces from HRMS and to AFRS. 	<ul style="list-style-type: none"> DOP instance is working in the state's infrastructure. Can utilize HRMS personnel database & AFRS interface. Current DOP version is not accessible. 	<ul style="list-style-type: none"> Meets accessibility. We need to develop interfaces to HRMS personnel & AFRS. Need to implement & configure the new SAP instance from scratch.
Licensing/Fees	<ul style="list-style-type: none"> Least need for software. Maybe some 3rd party tools for work flow or a business rules engine. Least variable one time cost estimate. Cheaper than COTS and SAP, but more expensive than ASP. 	<ul style="list-style-type: none"> Most variable one time cost estimate. 	<ul style="list-style-type: none"> Cheapest one time costs. 	<ul style="list-style-type: none"> Comparable to COTS. 	<ul style="list-style-type: none"> Comparable to COTS.
Project Staffing	<ul style="list-style-type: none"> Use current staff. No foreseeable need for consultants. Might be some M&O issues. 	<ul style="list-style-type: none"> More OFM involvement than with ASP. Need an integrator. Need to train OFM staff on using and configuring the product. 	<ul style="list-style-type: none"> Least OFM involvement. Need an integrator. Need to train OFM staff on using and supporting the product. 	<ul style="list-style-type: none"> Probably less OFM staff than the Build. Need an integrator. Need SAP expertise. Governance questions. 	<ul style="list-style-type: none"> Integrator + trained OFM staff. Will probably take the most staff to implement.

Criteria	Build	COTS	ASP	SAP w/HRMS	SAP Standalone
Project Schedule	<ul style="list-style-type: none"> • Longest duration to implement. • Calendar time to implement depends on enablers for the other options. 	<ul style="list-style-type: none"> • Would require an RFP. • 3 – 5 month estimates from vendors. 	<ul style="list-style-type: none"> • Would require an RFP. • 3-month estimate from vendor. 	<ul style="list-style-type: none"> • Probably less time than the Build. • Probably more time than COTS or ASP. • Need to establish DOP/OFM partnership 	<ul style="list-style-type: none"> • Would require an RFP. • More time than off the DOP SAP instance. • Probably requires less time than the build, but maybe not much.
Project Costs	<ul style="list-style-type: none"> • Cheaper than COTS or SAP. Around \$.5M. • Opportunity cost – staff could be working on other projects. 	<ul style="list-style-type: none"> • Similar to SAP Standalone / HRMS. Around \$1M. 	<ul style="list-style-type: none"> • Cheapest to implement. 	<ul style="list-style-type: none"> • Similar to COTS. Around \$1M. • Probably done as part of an HRMS release. 	<ul style="list-style-type: none"> • Similar to COTS. Around \$1M.
Hardware/Software	<ul style="list-style-type: none"> • Hardware is in current budget. • May be some 3rd party software. 	<ul style="list-style-type: none"> • Buy about four new servers. • Buy software. • Consider 3rd party software for things like point-to-point mileage. 	<ul style="list-style-type: none"> • No hardware. • Buy software. • Probably not able to use 3rd party software. 	<ul style="list-style-type: none"> • Utilize DOP software & hardware. • May need some additional servers. • 3rd party for point-to-point mileage. 	<ul style="list-style-type: none"> • More hardware needed than the other options. Probably want an isolated set of servers. • 3rd party for point-to-point mileage.
Ongoing Staffing	<ul style="list-style-type: none"> • Same as now. More expensive than COTS, cheaper than ASP. 	<ul style="list-style-type: none"> • Cheapest ongoing costs. 	<ul style="list-style-type: none"> • Most expensive ongoing costs. 	<ul style="list-style-type: none"> • Need SAP trained staff. 	<ul style="list-style-type: none"> • Need SAP trained staff. • More support staff needed than for the build. Training needs will be large at first. • Set of SAP-trained developers for configuration support, interfaces, and backup.

Criteria	Build	COTS	ASP	SAP w/HRMS	SAP Standalone
Risks	<ul style="list-style-type: none"> Lowest risk option. 	<ul style="list-style-type: none"> Resistance to Change. Need to enable policies & practices, but not as much as with SAP. More configurable than SAP and build. 	<ul style="list-style-type: none"> If the vendor goes out of business you quickly need to replace an enterprise solution. Resistance to Change. Less flexible than COTS or build. 	<ul style="list-style-type: none"> Higher risk than COTS. Governance. ERP risks & issues. Resistance to change. Need to enable policies & practices. 	<ul style="list-style-type: none"> Higher risk than COTS. ERP risks & issues. Resistance to change. Need to enable policies & practices.
Pros	<ul style="list-style-type: none"> Get what you want. 	<ul style="list-style-type: none"> Flexible & configurable. Vendor provides the upgrade path. OFM has more control over the configurable features than with ASP or SAP. 	<ul style="list-style-type: none"> Vendor supports the product. Vendor provides the upgrade path. 	<ul style="list-style-type: none"> A step towards a statewide enterprise solution. Many benefits inherent to an ERP solution (e.g., employee portal, workflow & profile from personnel database). 	<ul style="list-style-type: none"> Accessible. Can position the instance towards the SAP financials.
Cons	<ul style="list-style-type: none"> Longest duration. Cannot build all the advanced features the COTS / ERP have, e.g., high configurability. Need to add functionality to meet Roadmap recommendations as they are enabled. Requires enhancement projects for upgrades and changes. 	<ul style="list-style-type: none"> Vendor controls upgrade features and schedule. Any modifications need to be re-developed in upgrades. 	<ul style="list-style-type: none"> Vendor controls upgrade features and schedule. Least control over the environment. Ongoing utilization costs about the same as OFM revenues. 	<ul style="list-style-type: none"> Does not fit with DOP's priorities and schedule. Lots of enabling and business process change. Current HRMS SAP instance does not meet Section 508 guidelines. May run into conflicts with HRMS configurations or modifications. 	<ul style="list-style-type: none"> Doesn't make sense to do travel first, then financials. Doesn't make sense to run multiple instances of SAP that are interfacing with each other. Lots of enabling and business process change.

Appendix A. Functional Requirements Assessment

This table shows the essential functional requirements from the TEMS Software Requirements Specification and the Team's ratings of how effectively the various alternatives met the requirements. The Team's ratings are, in most cases, the shared perception the Team had based on the vendor presentation and any available materials. Some ratings are based on the vendors' replies to follow-up questions.

One vendor's product was available as a COTS alternative. Another vendor's product was available as either a COTS or ASP.

For the functional requirements assessment each alternative was given a score. The key to the scores is:

- 1 = Yes, the product meets this requirement either out of the box or through configuration.
- 2 = The product meets this requirements through a modification (work-around, customization, or with an additional module).
- 3 = No, the product does not meet this requirement.
- 4 = Unknown or not sure.

The Build alternative received "1s" in every cell because the TEMS Team would build the product to meet all the requirements.

ID	Function	Requirement	Build	ERP	COTS	COTS & ASP
REQ 3.01.001	Setup an Agency	The system must allow an agency to be entered into the system.	1	1	1	1
REQ 3.02.001	Inactivate an Agency	The system must allow an agency to be inactivated from the system.	1	1	1	1
REQ 3.03.001	Setup a User	The system must allow a user to be entered into the system by an agency or system administrator.	1	1	1	1
REQ 3.04.001	User Profile Information	The system must allow a requestor to enter, view, and / or change their profile information.	1	1	1	1
REQ 3.04.002	User Profile Information	The system must allow an agency administrator to enter, view, and / or change the user profile information.	1	1	1	1
REQ 3.04.003	User Profile Information	The system must allow the system administrator to enter, view, and / or change the user profile information.	1	1	1	1

ID	Function	Requirement	Build	ERP	COTS	COTS & ASP
REQ 3.04.004	User Profile Information	The system must allow an agency or system administrator to change a user's 'User ID' without the user losing access to their current or previously completed approval, payment and profile information.	1	1	1	1
REQ 3.05.001	Inactivate User Account	The system must allow a user's account to be inactivated and reactivated by an agency or system administrator.	1	1	1	1
REQ 3.07.001	Pre-Approval Request	The system must allow a preparer or requestor to enter, view, and / or change pre-approval information.	1	1	1	1
REQ 3.07.002	Pre-Approval Request	The system must validate meal, lodging & mileage rates, at time of proposed travel date and location.	1	1	1	1
REQ 3.07.004	Pre-Approval Request	The system must notify the preparer or requestor when a request exceeds the standard reimbursement rate available in the system database.	1	1	1	1
REQ 3.07.007	Pre-Approval Request	The system must allow a preparer to complete a pre-approval request on behalf of a requestor.	1	1	1	1
REQ 3.07.009	Pre-Approval Request	The system must require a preparer or requestor to obtain approval when lodging amounts are expected to exceed the standard reimbursement rate.	1	1	1	1
REQ 3.07.012	Pre-Approval Request	The system must allow a preparer or requestor to edit system-provided point-to-point mileage.	1	2	2	3
REQ 3.07.013	Pre-Approval Request	The system must allow a preparer or requestor to enter miscellaneous travel expenses.	1	1	1	1
REQ 3.07.015	Pre-Approval Request	The system must allow a preparer or requestor to enter the estimated dates of travel.	1	1	1	1

ID	Function	Requirement	Build	ERP	COTS	COTS & ASP
REQ 3.07.016	Pre-Approval Request	The system must allow a preparer or requestor to enter the mode of transportation and estimated transportation costs for the proposed trip.	1	1	1	1
REQ 3.07.017	Pre-Approval Request	The system must allow a preparer or requestor to enter the purpose of the proposed trip.	1	1	1	1
REQ 3.07.018	Pre-Approval Request	The system must allow a preparer or requestor to enter the itinerary and content of the proposed trip.	1	1	1	1
REQ 3.07.019	Pre-Approval Request	The system must allow an inactive voucher to be reactivated and available for use.	1	1	1	1
REQ 3.07.020	Pre-Approval Request	The system must allow approvers involved in the workflow to change pre-approval information.	1	1	1	1
REQ 3.08.001	Reimbursement Request	The system must allow a preparer or requestor to enter, view, and / or change reimbursement information.	1	1	1	1
REQ 3.08.002	Reimbursement Request	The system must validate, at the time of preparer or requestor input, reimbursement rates and amounts entered by the preparer or requestor.	1	1	1	1
REQ 3.08.003	Reimbursement Request	The system must display in the reimbursement request, the data fields previously completed during the pre-approval and / or pre-payment process (i.e. Travel advance).	1	1	1	3
REQ 3.08.004	Reimbursement Request	The system must allow the preparer or requestor to inactivate their request if it has not been processed for payment. After the preparer or requestor inactivation, the system will no longer display the inactivated request.	1	1	1	3

ID	Function	Requirement	Build	ERP	COTS	COTS & ASP
REQ 3.08.005	Reimbursement Request	The system must notify preparers or requestors when a request exceeds the standard reimbursement rate allowable and make the rate available for edit within the voucher.	1	1	1	1
REQ 3.08.006	Reimbursement Request	The system must provide a method for a user to enter comments and explanations.	1	1	1	1
REQ 3.08.007	Reimbursement Request	The system must provide a method for a user to view comments and explanations.	1	1	1	1
REQ 3.08.008	Reimbursement Request	The system must allow a preparer to complete a reimbursement request on behalf of a requestor.	1	1	1	1
REQ 3.08.009	Reimbursement Request	The system must restrict the fiscal user, on a daily basis, from assigning duplicate batch numbers.	1	1	1	2
REQ 3.08.013	Reimbursement Request	The system must notify the preparer or requestor that a receipt is required for reimbursement.	1	1	1	1
REQ 3.08.014	Reimbursement Request	The system must allow a requestor to be reimbursed for taxes paid for lodging.	1	1	1	1
REQ 3.08.015	Reimbursement Request	The system must apply the business rules that allow a requestor to exceed the standard lodging amounts.	1	1	1	1
REQ 3.08.016	Reimbursement Request	The system must verify that prior approval for lodging amounts that exceed the standard reimbursement rate was obtained.	1	1	1	1
REQ 3.08.017	Reimbursement Request	The system must enforce the business rules that apply for a requestor's meal reimbursement rate on their last day of travel.	1	1	2	1
REQ 3.08.019	Reimbursement Request	The system must provide, as a guide to the preparer or requestor, the distance (mileage) between selected travel points or round trip within Washington State.	1	2	3	3

ID	Function	Requirement	Build	ERP	COTS	COTS & ASP
REQ 3.08.020	Reimbursement Request	The system must allow the preparer or requestor to enter vicinity or local miles traveled and eligible for reimbursement.	1	1	1	2
REQ 3.08.021	Reimbursement Request	The system must allow a preparer or requestor to edit system provided point-to-point mileage.	1	2	3	3
REQ 3.08.022	Reimbursement Request	The system must allow a preparer or requestor to enter miscellaneous travel expenses.	1	1	1	1
REQ 3.08.024	Reimbursement Request	The system must allow a preparer or requestor to enter the exact time of the itinerary arrivals and departures.	1	1	2	1
REQ 3.08.025	Reimbursement Request	The system must allow approvers involved in the workflow to change reimbursement information.	1	1	1	1
REQ 3.08.026	Reimbursement Request	The system must allow the fiscal user involved in the workflow to change reimbursement information.	1	1	1	1
REQ 3.08.028	Reimbursement Request	The system must allow the preparer or requestor to indicate that a meal was provided and is not reimbursable.	1	1	1	1
REQ 3.08.029	Reimbursement Request	The system must allow an inactive voucher to be reactivated and available for use.	1	1	1	1
REQ 3.10.001	Account Coding	The system must allow a user to enter all account-coding fields that are used in state's General Ledger & Payment System during the pre-approval, pre-payment, and reimbursement process.	1	1	1	1
REQ 3.10.002	Account Coding	The system must allow a user to enter and / or change account-coding information upon and / or after input of pre-approval, pre-payment and reimbursement information.	1	1	1	1
REQ 3.10.003	Account Coding	The system must allow a user to enter account-coding information.	1	1	1	1

ID	Function	Requirement	Build	ERP	COTS	COTS & ASP
REQ 3.10.005	Account Coding	The system must allow an agency or system administrator to restrict any specific user or class from entering account-code information.	1	1	1	1
REQ 3.10.006	Account Coding	The system must provide an agency or system administrator the ability to specify in what order or sequence the account-coding fields will be displayed for input.	1	2	3	1
REQ 3.10.008	Account Coding	The system must provide in-state, out-of-state, mileage, miscellaneous expenses, taxable subtotals, and a grand total for the amount of the pre-approval, pre-payment and reimbursement request.	1	3	3	1
REQ 3.10.009	Account Coding	The system must provide the fiscal users the ability to make account-coding adjustments that increase or decrease the reimbursement amount.	1	1	1	1
REQ 3.10.010	Account Coding	The system must provide the preparer, requestor, and approver the ability to make account-coding adjustments that decrease the reimbursement amount.	1	1	1	1
REQ 3.10.019	Account Coding	The system must have the ability to adjust the expense reimbursement and account coding.	1	1	1	1
REQ 3.10.020	Account Coding	The system must allow for configurable account-coding blocks.	1	2	1	1
REQ 3.11.001	Payment Approval	The system must provide the necessary data and payment information to all fiscal users and approvers so the review / approval and account-coding process can be completed.	1	1	1	1
REQ 3.11.002	Payment Approval	The system must allow multiple fiscal users the ability to access, review any pending payment request, but must restrict approval and changes of a request to only one fiscal user at a time.	1	1	1	1

ID	Function	Requirement	Build	ERP	COTS	COTS & ASP
REQ 3.11.003	Payment Approval	The system must provide the user with the most recent version of a current payment request.	1	1	1	1
REQ 3.11.005	Payment Approval	The system must not allow the preparer or requestor requesting payment to approve the payment.	1	1	1	1
REQ 3.11.006	Payment Approval	The system must indicate to users the payment request status.	1	1	1	1
REQ 3.11.007	Payment Approval	The system must validate if the account-coding amount agrees with the payment request amount before the request is released for payment. If the amounts do not agree, the system must notify the fiscal user of the difference and allow the fiscal user to either correct or inactivate the operation.	1	1	1	1
REQ 3.11.008	Payment Approval	The system must inquire the preparer or requestor, when an initial travel lodging reimbursement request has been made, if lodging receipts or required documents have been obtained. Once a preparer or requestor has acknowledged that receipts or required documents have been obtained, the system no longer needs to inquire.	1	1	1	1
REQ 3.11.009	Payment Approval	The system, after inquiring if the approver has obtained lodging receipts, must allow the approver to indicate they have not obtained the lodging receipts and not allow the approver to continue processing the payment request.	1	1	2	1
REQ 3.11.010	Payment Approval	The system must identify reimbursement requests that require receipt documentation per the selected business rules, but the approvers have indicated that 'receipts' have not been obtained.	1	1	1	4

ID	Function	Requirement	Build	ERP	COTS	COTS & ASP
REQ 3.11.011	Payment Approval	The system must identify to the Approver any payment request that was completed by someone other than the person who will receive payment.	1	1	1	1
REQ 3.11.012	Payment Approval	The system must identify to the Approver any payment request that differs from the standard reimbursement rate.	1	1	1	1
REQ 3.11.013	Payment Approval	The system must identify to the Approver any payment request that cannot be validated against a reimbursement rate.	1	1	1	4
REQ 3.11.014	Payment Approval	The system must identify to the approval and fiscal users, payment requests that are ready for review, approval and account coding.	1	1	1	1
REQ 3.11.016	Payment Approval	The system must notify the requestor or preparer of the payment request when an approver has changed the payment amount.	1	1	1	1
REQ 3.11.017	Payment Approval	The system must apply the business rules for out-of-state travel and travel advance payments by requiring employees to have received pre-approval from their agency head or designee before disbursement is made.	1	1	1	1
REQ 3.11.018	Payment Approval	The system must apply the business rules for out-of-country travel by requiring employees who work for an agency that report to the governor to have received pre-approval from the governor before disbursement is made.	1	1	1	1
REQ 3.11.019	Payment Approval	The system must apply the business rules for out-of-country travel by requiring employees who work for an agency that report to a governing body to have received pre-approval from the governing body before disbursement is made.	1	1	1	1

ID	Function	Requirement	Build	ERP	COTS	COTS & ASP
REQ 3.11.020	Payment Approval	The system must allow the fiscal group to change the data.	1	1	1	1
REQ 3.12.001	Manage Workflow	The system must allow the approval and payment workflow process to occur within an agency.	1	1	1	1
REQ 3.12.002	Manage Workflow	The system must allow for different workflows / routing processes for each agency.	1	1	1	1
REQ 3.12.004	Manage Workflow	The system must allow the preparer or requestor to determine which authorized approver they would like to route the payment request to.	1	3	1	1
REQ 3.12.005	Manage Workflow	The system must allow approvers to route the payment request back to the preparer or requestor receiving the payment or a prior approver with an e-mail notification to the preparer or requestor.	1	1	1	1
REQ 3.12.006	Manage Workflow	The system must be able to restrict a preparer or requestor's initial submittal for pre-approval, pre-payment or reimbursement to an authorized approver.	1	1	1	1
REQ 3.12.007	Manage Workflow	The system must allow an approver to route a payment request to another approver.	1	3	3	1
REQ 3.12.008	Manage Workflow	The system must allow fiscal users to update and reroute transactions up until the point that the transactions are released to the accounting system for payment.	1	1	1	1
REQ 3.12.009	Manage Workflow	The system must allow an agency or system administrator to route a request to any active user.	1	1	1	1
REQ 3.12.010	Manage Workflow	The system must allow an agency or system administrator to route a pending payment or approval request to any active user.	1	1	1	1

ID	Function	Requirement	Build	ERP	COTS	COTS & ASP
REQ 3.12.011	Manage Workflow	The system must allow a system administrator to route a payment from 'Paid' status to 'Unpaid' status.	1	1	1	3
REQ 3.12.012	Manage Workflow	The system must display to the user the 'status' of the request before and after the routing process.	1	1	1	1
REQ 3.12.013	Manage Workflow	The system must log and display to all users, any edits or changes made to a pre-approval, pre-payment or reimbursement request not performed by the original author after the initial submission.	1	1	1	1
REQ 3.12.014	Manage Workflow	The system must allow the agency administrator to delegate authority to another approver when the current approver is not available. Notification should be sent to the delegated authority and original approver.	1	1	1	1
REQ 3.12.015	Manage Workflow	The system must provide notification to the delegated approver that there are vouchers for review in the original approver's queue.	1	1	3	1
REQ 3.12.016	Manage Workflow	The system must notify the original approver when the delegated approver completes any action.	1	1	3	1
REQ 3.12.017	Manage Workflow	The system must allow multiple approvers the ability to access and review any pending payment requests, but must restrict approval and changes of a request to only one approver at a time.	1	1	1	3
REQ 3.13.001	Report / Query Information	The system must provide a method for the user to print selective input information used to process pre-approval, pre-payment or reimbursement requests.	1	1	1	1
REQ 3.13.002	Report / Query Information	The system must allow the user to print help information.	1	1	1	1

ID	Function	Requirement	Build	ERP	COTS	COTS & ASP
REQ 3.13.003	Report / Query Information	The system must provide a method for the user to print the workflow of a request that is in the process of being paid.	1	1	1	1
REQ 3.13.004	Report / Query Information	The system must provide a method for the user to print policy exceptions, as they relate to a payment request.	1	1	1	1
REQ 3.13.005	Report / Query Information	The system must provide a method for a preparer or requestor to print a list of the requestor's requests that have been submitted for approval.	1	1	1	1
REQ 3.13.007	Report / Query Information	The system must provide a method for a preparer or requestor to print a list of the requestor's requests that have been paid.	1	1	2	1
REQ 3.13.008	Report / Query Information	The system must provide a method for a preparer or requestor to print a list of the requestor's requests that have been denied.	1	1	2	1
REQ 3.13.009	Report / Query Information	The system must have a search and query capability of every field based on user roles.	1	1	3	3
REQ 3.13.011	Report / Query Information	The system must allow a system administrator to query and provide a list of all active and inactive users on the system.	1	1	2	1
REQ 3.13.014	Report / Query Information	The system must provide a method for an approver to print a list of requests that have been paid.	1	1	2	1
REQ 3.13.015	Report / Query Information	The system must provide a method for an approver to print a list of requests that have been denied.	1	1	2	1
REQ 3.13.019	Report / Query Information	The system must have the ability to create reports and configure and save templates at the agency level.	1	1	1	1
REQ 3.13.020	Report / Query Information	The system must be capable of creating electronic reports.	1	1	1	2

ID	Function	Requirement	Build	ERP	COTS	COTS & ASP
REQ 3.14.001	System Help	The system must allow any user to request online, interactive help from any screen in the system.	1	1	1	1
REQ 3.14.002	System Help	The system must display information pertinent to the screen the user was on when help was requested.	1	1	1	1
REQ 3.14.003	System Help	The system must have an online help feature with content configurable by agency.	1	3	3	3
REQ 3.14.004	System Help	The system must respond to a user's request for help by displaying information in a window different from the window the user is working in.	1	1	1	1
REQ 3.14.005	System Help	The system must provide an online comprehensive tutorial on how to use the system.	1	1	3	1
REQ 3.14.006	System Help	The system must provide an online overview of the system features and a summary of the various screens and their functions.	1	1	2	1
REQ 3.15.001	Broadcast Message	The system must allow a system administrator to initiate and change a message to appear on each user's welcome screen and to stop the display when it is no longer needed.	1	1	1	1
REQ 3.15.002	Broadcast Message	The system must allow an agency administrator to initiate and change a message to appear on each user's welcome screen and to stop the display when it is no longer needed.	1	1	3	3
REQ 3.16.001	Policy Exceptions - System Notification	The system must notify the user when a policy exception has occurred in completing a payment request.	1	1	1	1
REQ 3.17.001	Maintenance of User information	The system must allow an agency or system administrator to assign and remove access / permission levels for users.	1	1	1	1

ID	Function	Requirement	Build	ERP	COTS	COTS & ASP
REQ 3.17.002	Maintenance of User information	The system must allow an agency or system administrator to enter and/ or change user profile information.	1	1	1	1
REQ 3.17.003	Maintenance of User Information	The system must allow an agency or system administrator to delegate who can prepare a request for approval or payment on behalf of someone else (another user).	1	1	1	1
REQ 3.17.004	Maintenance of User information	The system must prevent recorded transaction activity for pre-approval, pre-payment or reimbursement from being deleted from the system.	1	1	1	1
REQ 3.17.005	Maintenance of User Information	The system must allow an agency or system administrator to create a group of users that can prepare pre-approval or reimbursement requests on behalf of someone else (another user).	1	1	1	1
REQ 3.17.006	Maintenance of User Information	The system must allow an agency or system administrator to remove a user from a preparer or fiscal group.	1	1	1	1
REQ 3.17.007	Maintenance of User Information	The system must allow an agency or system administrator to create a group of fiscal users that can review and code payment requests.	1	1	1	1
REQ 3.17.008	Maintenance of User Information	The system must allow an agency or system administrator to inactivate a preparer or fiscal group.	1	1	1	1
REQ 3.17.009	Maintenance of User information	The system must allow an agency or system administrator to reactivate an inactive group or inactive user account.	1	1	1	1

Appendix B. Technical Requirements Assessment

This table shows the essential technical requirements from the TEMS Software Requirements Specification and the Team's ratings of how effectively the various alternatives met the requirements. The Team's ratings are, in most cases, the shared perception the Team had based on the vendor presentation and any available materials. Some ratings are based on the vendors' replies to follow-up questions.

One vendor's product was available as a COTS alternative. Another vendor's product was available as either a COTS or ASP.

For the technical requirements assessment each alternative was given a score. The key to the scores is:

- 1 = Yes.
- 2 = No
- 3 = Unknown or not sure

The Build alternative received "1s" in every cell because the TEMS Team would build the product to meet all the requirements.

ID	Requirement Category	Requirement	Build	ERP	COTS	COTS & ASP
	User Interfaces	Has the vendor completed a Voluntary Product Accessibility Template (VPAT)?	1	1	1	1
	User Interfaces	What process was used to complete the Voluntary Product Accessibility Template (VPAT)? (E.g. developers, testers, 3rd party company, etc.)	3rd Party	Comp	Comp	Comp
	User Interfaces	Did the vendor score themselves as meeting the accessibility requirements on the Voluntary Product Accessibility Template (VPAT)?	No, use a consultant	3	Yes	3
Maintainability	Software Quality	The system shall have a documented process for recovering the system and/or systems data to facilitate changing/upgrading of hardware.	1	1	2	3
OE-1	Operating Environment	The system must be able to run on standard Intel based hardware with Microsoft Windows 2003 and IIS 6.0.	1	1	2	1

ID	Requirement Category	Requirement	Build	ERP	COTS	COTS & ASP
OE-2	Operating Environment	The system must utilize OFM standard Microsoft SQL 2000/2005 for all database functionality.	1	1	1	1
OE-3	Operating Environment	The system must have a browser based thin client user interface for all system users. The system should not require any system vendor supplied software to be loaded onto a users workstation prior to use.	1	1	1	1
OE-4	Operating Environment	For an OFM developed and/or maintained system the system should utilize the standard reporting, ad-hoc reporting, and data query features delivered by the Enterprise Reporting group for ad-hoc reporting requirements not provided by the system.	1	1	1	1
OE-5	Operating Environment	The proposed solution must be scalable, with simplicity of scaling options for all aspects of hardware, software, site management services, connectivity, and the number of concurrent users.	1	1	1	1
OE-6	Operating Environment	The system must allow access from standard pc hardware across the statewide intergovernmental network (IGN) and through the DIS Fortress server.	1	1	1	1
OE-7	Operating Environment	The client portion of the system must run on a Windows based pc with Internet Explorer 6.0.	1	1	1	1
CO-1	Design and Implementation Constraints	The system's design, code, and maintenance documentation shall conform to the OFM Application Technology Architecture – Application Standards - .NET Application Standards. (http://ofm004/ata/standards/standards.htm)	1	3	2	2

ID	Requirement Category	Requirement	Build	ERP	COTS	COTS & ASP
CO-5	Design and Implementation Constraints	All external interfaces will be based on real-time messaging with guaranteed delivery or via file import/export.	1	3	2	2
SD-1	System Documentation	There must be clear and comprehensive documentation on the solution to include: Installation documentation, system documentation including component design and data design and vendor support for system problems and issues.	1	1	3	2
SD-2	System Documentation	The system shall provide comprehensive operational documentation including but not limited to online help and user guide. User documentation should clearly describe the procedures that will maintain the operational quality of the system.	1	1	1	1
SD-3	System Documentation	There must be clear and comprehensive installation documentation that allows OFM to determine the impact of installation.	1	1	3	2
SD-4	System Documentation	There must be clear and comprehensive maintenance and support documentation that allows OFM to determine the impact of implementation AND ongoing maintenance and support.	1	1	3	2
SD-5	System Documentation	There must be clear and comprehensive system training documentation.	1	1	3	2
UI-2	User Interfaces	The system shall provide context sensitive help.	1	1	1	1
UI-3	User Interfaces	The system must allow a user to login to the system using standard OFM authentication methods.	1	1	2	2
UI-4	User Interfaces	The system must provide the user with a clear method of exiting the system (e.g. a "logout" button).	1	1	1	1

ID	Requirement Category	Requirement	Build	ERP	COTS	COTS & ASP
SI-1.1	Software Interfaces	The system must provide generic import/export interfaces of payment and accounting data to agency accounting systems that must be configurable on an agency-by-agency basis.	1	1	1	1
SI-1.2	Software Interfaces	There must be an interface back into the system for results of importing/exporting to be fed back to the various accounting systems. The information would be used to determine the success or failure of the transactions in the accounting system.	1	1	2	1
SI-2	Software Interfaces	There must be an interface to allow update of user profile information from an agency's or statewide HRMS system.	1	1	1	2
SI-3	Software Interfaces	There must be an interface with an agency's HRMS system to export taxable reimbursement data.	1	1	1	2
SI-4	Software Interfaces	The system must support data export for archival. (This may also include sending data to agency imaging systems.)	1	1	1	1
SI-5	Software Interfaces	The system may need to interface with various travel planning processes as proposed by the Washington State Roadmap.	1	1	3	1
SI-6	Software Interfaces	The system may need to interface with corporate credit card vendors to process credit card transactions as proposed by the Washington State Roadmap.	1	1	1	1
SI-7	Software Interfaces	The system may need to interface with a receipt processing system (either owned and operated by OFM or a 3rd party) to manage required documentation for reimbursements.	1	1	1	1

ID	Requirement Category	Requirement	Build	ERP	COTS	COTS & ASP
SI-8	Software Interfaces	The system may need to support Electronic Data Interchange (EDI) with external, 3rd parties.	1	1	3	3
CI-1	Communications Interfaces	The system must be capable of sending an e-mail message to the users involved in the workflow, notifying them of any approval and/or payment status changes.	1	1	1	1
CI-2	Communications Interfaces	The system must be capable of assigning and sending a new password to a user upon a user's request.	1	1	1	2
PE-1	Performance	The system shall be at least 99.5% available for use 24 hour a day, seven days a week.	1	1	1	1
PE-3	Performance	No system function shall timeout.	1	1	3	1
SE-1	Security	The system must protect data from wrongful access. This includes protection of data throughout its entire lifecycle including when at rest, when transmitted across networks, and when being processed. Data exchanged between client software and host software must be managed in a secure way by the TEMS application. Confidential data should never be in clear text.	1	1	3	1
SE-3	Security	Include trace information: who did what, when, and using what computer. · Derive tracing information automatically where feasible.	1	1	1	1
SE-5	Security	Clearly warn users against putting confidential information into the system (OFM to draft warning).	1	3	1	3
SE-6	Security	Include and enforce user permissions and restrictions using a role-based approach.	1	1	1	1

ID	Requirement Category	Requirement	Build	ERP	COTS	COTS & ASP
SE-7	Security	The system will provide the ability to set up the following roles: <ul style="list-style-type: none"> · Preparer · Requestor · Fiscal User · Approver/Reviewer · Agency Administrator · System Administrator 	1	1	3	1
SE-8	Security	The system must provide application level user authentication and authorization tools and allow integration with single sign-on authentication. These tools will be used to limit access to authorized users only. The State has implemented Active Directory for network user authentication. Active directory is not fully deployed to all parts of the State at this time. It is desirable that the system relies on Active Directory user authentication for this purpose when the user is on the active directory.	1	1	2	2
SE-9	Security	The system should be password protected and should be able to work with users authenticated through active directory. The system must be able to enforce the States strong password guidelines as well as State password expiration. Password expiration time span must be configurable so each agency in the system can have their own setting in addition to a system maximum default.	1	1	2	2

ID	Requirement Category	Requirement	Build	ERP	COTS	COTS & ASP
SE-10	Security	The system should provide work flow/routing such that rules can be established and based on those rules the workflow engine would determine the next step in the route. The route needs to be flexible enough to be overridden while in process to allow for user-initiated exceptions.	1	1	1	1
Availability-3	Software Quality	The system will be accessible via the state intranet or the internet through the Fortress.	1	1	1	1
Conversion-1	Software Quality	The data structures of the solution must allow and provide information on conversion of current TVS data as well as conversions from agency owned travel management systems. Specific requirements of conversion have not been determined. (The new system must be capable of receiving traveler profile, itinerary and accounting data from the old system.)	1	1	3	3
Flexibility-1	Software Quality	In order to meet the challenge of changing business rules, wherever possible rules that are likely to change with any frequency should be externalized so that changes can be made without recompiling and redeploying the system. (Business Rule Engine)	1	1	1	1
Interoperability-1	Software Quality	The system must be able to import users from an external source such as a tab delimited text file.	1	1	1	1
Maintainability-4	Software Quality	Either a purchased or built system shall provide central administration of data.	1	1	1	1
Maintainability-4	Software Quality	Either a purchased or built system shall provide central administration of business rules.	1	1	1	1

ID	Requirement Category	Requirement	Build	ERP	COTS	COTS & ASP
Maintainability-4	Software Quality	Either a purchased or built system shall provide central administration of workflow/routing.	1	1	1	1
Maintainability-4	Software Quality	Either a purchased or built system shall provide a layered architecture with clear logical boundaries.	1	1	3	3
Maintainability-4	Software Quality	Either a purchased or built system shall provide message-based and loosely coupled interfaces.	1	1	3	3
Maintainability-4	Software Quality	Either a purchased or built system shall provide event-driven transactions.	1	3	1	1
Maintainability-4	Software Quality	Either a purchased or built system shall provide cohesive components that support a small set of functions for ease of testing.	1	1	1	3
Reliability-2	Software Quality	There must be safeguards such that if a batch of transactions does not go through, there must be a method for resubmission of the transactions.	1	1	3	2
Robustness-1	Software Quality	The system must provide meaningful error messages to users when faced with invalid user input.	1	1	1	1
Robustness-2	Software Quality	There needs to be a mechanism that does not allow two users to edit a voucher simultaneously. There needs to be a read only, check in/out mode to accomplish this.	1	1	3	1
Robustness-3	Software Quality	The system must fail gracefully if connections the backend databases are terminated.	1	1	3	3
Robustness-4	Software Quality	The data access should be transactional so that when errors occur a rollback of partially completed transactions is possible.	1	1	3	3

Appendix C: Assumptions for the TEMS Alternatives Cost Analysis

General

- There will be no additional OFM staff available to add to the TEMS project
- OFM staff costs are estimated as \$6,125 a month for Biennium 05-07 and \$6,431 a month for Biennia after 05-07

Build Option:

- It will take 18 months to implement TEMS if OFM builds it
- We will not need new servers to run TEMS
- There will be regular upgrades to the product - probably annual
- Other Accounting Web product enhancements will be on hold while we build TEMS

COTS Option:

- Support requirements for OFM staff will be less than a Build option. Software upgrades will require less application development team time.
- It would take 5 months to develop and award the RFP
- Requires two months implementation (one-time) effort from OFM after vendors are finished.
- We will need 4 new servers to run TEMS with a COTS
- Assume \$2,500 living expenses a month for vendors who include living expenses as part of implementation

ASP Option:

- Support requirements for OFM staff will be less than a Build or COTS option. There would be no software upgrades.
- It would take 5 months to develop and award the RFP
- An ASP would take about 3 months to configure and build interfaces out of HRMS and to accounting systems.
- Requires two months implementation (one-time) effort from OFM after vendors are finished.
- There will be few configurations available with an ASP option

SAP w/HRMS Option:

- Does not require an RFP.
- Requires no additional servers
- Requires two months implementation (one-time) effort from OFM after vendors are finished.
- We do not know how many new servers will be required to run TEMS under HRMS

SAP Standalone Option:

- Requires an RFP. Similar to a COTS solution. Process would be the same.
- Requires two months implementation (one-time) effort from OFM after vendors are finished.
- We will need 4 new servers to run TEMS w/SAP standalone